

1 21. A method for replacing a section of blood vessel inner layer
2 comprising the steps of:
3 forming an incision into the blood vessel;
4 removing a section of an inner layer of the blood vessel through the incision,
5 wherein the removal creates at least one end flap in a remaining blood vessel inner layer;
6 providing an artificial blood vessel inner layer comprising a diameter
7 arranging element at one end thereof, creating an expandable end, and a supple tubular
8 section having inner and outer surfaces;
9 inserting the expandable end of said artificial inner layer into said blood vessel
10 through the incision in the direction of blood flow; and
11 positioning said artificial inner layer within said blood vessel so that said
12 expandable end is positioned adjacent said remaining blood vessel inner layer at a
13 downstream location from said incision; and
14 retaining said expandable end against said blood vessel by said diameter
15 arranging element.

1 22. A method as in claim 21, wherein said providing step comprises
2 providing an artificial blood vessel inner layer having a tubular section comprising a fluoro
3 carbon polymer.

1 23. A method as in claim 21, wherein said providing step comprises
2 providing an artificial blood vessel inner layer having a tubular section that has a length at
3 least as long as said removed section of blood vessel inner layer.

1 24. A method as in claim 21, wherein said providing step comprises
2 providing an artificial blood vessel inner layer having a diameter arranging element
3 comprising stainless steel.

1 25. A method as in claim 21, wherein said providing step comprises
2 providing an artificial blood vessel inner layer having a diameter arranging element
3 comprising a length of memory metal preprogrammed to expand at a determined temperature.

1 26. A method as in claim 21, wherein said providing step comprises
2 providing an artificial inner layer having an enclosure comprising a fluid-tight enclosure.

1 27. A method as in claim 21, wherein said providing step is carried out
2 with said diameter arranging element made of a metal.

1 28. A method as in claim 21, wherein said providing step is carried out
2 with said diameter arranging element in the form of a coil.

1 29. A method as in claim 21, wherein said providing step is carried out
2 with said diameter arranging element and said supple tubular section made of different
3 materials.

1 30. A method as in claim 21, wherein said providing step is carried out
2 with said expandable end created by folding a portion of said tubular section back over the
3 outer surface creating an enclosure with said diameter arranging element at least partially
4 captured therein.

1 31. A method as in claim 21, wherein said providing step is carried out
2 with said expandable end created by at least partially capturing said diameter arranging
3 element within said tubular section.

1 32. A method as in claim 21, wherein said positioning step comprises
2 positioning said artificial inner layer using a catheter.

1 33. A method as in claim 32, wherein said catheter comprises an elongate
2 member slidably housed within a hollow sheath.

1 34. A method as in claim 32, wherein said catheter comprises a blood
2 vessel widener.

1 35. A method as in claim 34, wherein said widener comprises a cone-
2 shaped element operably attached to a distal end of said catheter.

1 36. A method as in claim 34, wherein said widener comprises an inflatable
2 balloon operably attached to a distal end of said catheter.

1 37. A method as in claim 34, wherein said widener is wider than said end
2 section during said inserting step and narrower than said end section after said retaining step
3 due to said diameter arranging element expanding during said expanding step.

1 38. A method as in claim 34, wherein said widener has substantially the
2 same diameter as an internal diameter of said blood vessel.

1 39. A method as in claim 34, wherein said retaining step comprises using
2 said widener to widen said diameter arranging element in order to press said end section
3 against said blood vessel.

1 40. A method as in claim 21, wherein said retaining step comprises
2 expanding said diameter arranging element so that an outer diameter of said tubular section is
3 approximately equal to an inner diameter of said blood vessel.

1 41. A method as in claim 21, wherein the providing step comprises
2 providing an artificial blood vessel inner layer further comprising a diameter arranging
3 element at each end thereof creating two expandable ends.

1 42. A method as in claim 21, further comprising the step of stitching one
2 end section to said blood vessel.

1 43. A method as in claim 34, further comprising the step of bunging the
2 blood vessel.

1 44. A method as in claim 43 wherein said bunging step comprises bunging
2 said blood vessel using said widener.

1 45. A method as in claim 34, further comprising the step of exerting
2 pressure outwardly on said diameter arranging element with said widener during a
3 withdrawal of said catheter from said blood vessel.

1 46. A method for lining a section of a blood vessel comprising the steps of:
2 forming an incision into the blood vessel;
3 removing matter from a length of the blood vessel through the incision;
4 providing an artificial blood vessel inner layer comprising first and second
5 ends, a diameter arranging element at said first end thereof creating a first expandable end,
6 and a supple tubular section having inner and outer surfaces between the first and second
7 ends;

8 inserting the first expandable end of said artificial inner layer into said blood
9 vessel through the incision;

10 positioning said artificial inner layer within said blood vessel so that said
11 artificial inner layer covers at least a portion of said length of the blood vessel; and
12 retaining said artificial inner layer against the blood vessel by expanding said
13 diameter arranging element.

1 47. A method as in claim 46, wherein said providing step comprises
2 providing an artificial blood vessel inner layer having a tubular section that has a length at
3 least as long as said removed section of blood vessel inner layer.

1 48. A method as in claim 46, wherein said providing step comprises
2 providing an artificial inner layer having an enclosure comprising a fluid-tight enclosure.

1 49. A method as in claim 46, wherein said providing step is carried out
2 with said diameter arranging element and said supple tubular section made of different
3 materials.

1 50. A method as in claim 46, wherein said providing step is carried out
2 with said diameter arranging element and said supple tubular section made of different
3 materials.

1 51. A method as in claim 46, wherein said positioning step comprises
2 positioning said artificial inner layer using a catheter.

1 52. A method as in claim 51, wherein said catheter comprises an elongate
2 member slidably housed within a sheath.

1 53. A method as in claim 51, wherein said catheter comprises a blood
2 vessel widener.

1 54. A method as in claim 46, wherein said retaining step comprises
2 expanding said diameter arranging element so that an outer diameter of said tubular section is
3 approximately equal to an inner diameter of said blood vessel.